PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

An improved instrument for trimming the hooves and dressing the teeth of animals for example, sheep or horses

We, EINER JOHANNES HANSEN, of 709 Seddon Street, Hastings, in the Dominion of New Zealand, and RALPH HENRY WATT LOWRY, of Dartmoor Station, R. D. NAPIER, in the Dominion of New Zealand, both British subjects and New Zealand citizens, hereby declare this invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an instrument for trimming the hooves and dressing the teeth of animals, for example sheep or horses.

Since a chief use of the instrument of the invention is in the trimming of hooves, particularly those of sheep, the instrument will, for convenience and simplicity, be described mainly in that connection. The instrument may however be used for any operation of a similar nature to the aforementioned dressing and trimming.

Hitherto, for the purpose of trimming hooves, use has been made of hand-operated snips or a paring knife. With these forms of instruments, great care must be taken in carrying out the trimming operation for fear otherwise that the sensitive part of the foot will be cut into, causing the animal to jump, with risk of injury to the operator from the animal or from the instrument itself.

According to one aspect of the present invention there is provided an instrument for trimming the hooves and dressing the teeth of animals, for example sheep or horses, including a spindle journalled for rotation in bearings, an elongated cylindrical cutting tool carried by and connected to the spindle, stop means extending over a substantial portion of the length of the tool, for limiting the penetration of the tool in the radial direction thereof, and means enabling the spindle to be connected to a source of motive power for rotating the spindle and thereby rotating the cutting tool.

(*Price* 3*s.* 6*d.*)

According to another aspect of the present invention, the instrument comprises a spindle journalled for rotation in a housing, a tubular cutter-head provided at one end of the housing, a cylindrical cutting tool provided on the corresponding end of the spindle and extending, with a working clearance, into the cutter-head, and means enabling the other end of the spindle to be placed in connection with a source of motive power for rotating the spindle with consequent rotation of the cutting tool, the cutter-head being so formed that part of the cylindrical surface of the cutting tool projects from the head.

There will now be described, by way of example and with reference to the accompanying drawings, one practical form of the instrument of the invention.

In the drawings:

Figure 1 is a side elevational view of the instrument;

Figure 2 is a plan view corresponding to Figure 1;

Figure 3 is a longitudinal sectional view on the line III-III of Figure 2;

Figure 4 is an end view looking in the direction of the arrow IV in Figure 1;

Figure 5 is a cross-sectional view, to an enlarged scale, on the line V-V of Figure 1;

Figure 6 is a fragmentary end view also to an enlarged scale, the view being taken in the direction of the arrow VI in Figure 1 and illustrating a slight modification, and

Figure 7 is a fragmentary side elevational view illustrating a detail.

As shown in the drawings, the instrument comprises a horizontally disposed elongated cylindrical housing 1 forming one of two parts of a hand-piece generally indicated at 2, the housing being formed throughout its length with a cylindrical bore (Figure 3) the rear end portion of which is of relatively large diameter as indicated at 1*a*, while the forward end portion is of relatively small diameter as indicated at 1*b*. The forward end of the

housing is formed with a reduced screw-threaded portion 1c around which is engaged the rear end portion of a cylindrical cutter-head 3 which is of the same external diameter as the housing 1 and forms a continuation of the housing so that it constitutes the other one of the two parts of the hand-piece 2. The outer surface of the housing 1 and the rear end portion of the outer surface of the cutter-head are milled as shown in Figures 1, 2 and 7, to enable a firm grip to be obtained on the hand-piece 2.

The forward end portion of the outer surface of the cutter-head 3 is tapered towards the free end of the cutter-head, as indicated at 3a, while the cutter-head is formed throughout its length with a cylindrical bore 3b of larger diameter than the forward end portion 1b of the bore of the housing 1.

The forward end portion of the outer surface of the cutter-head 3 is formed with faces 4 extending part-way along the cutter-head from the free end thereof, the plane of the faces being parallel to the longitudinal axis of the cutter head and being so positioned as to intersect the bore 3b of the cutter head to provide a slot 5 (Figures 2, 5 and 6) opening into one side of the bore 3b and extending part-way along the cutter-head. The distance between the upper and lower edges of the slot 5 where it actually opens into the bore 3b of the cutter-head 3 is thus less than the diameter of the bore 3b.

The housing 1 is mounted rotatably around the forward end portion of a cylindrical spigot 6 which is formed with a cylindrical bore 6a. The rear end portion of the spigot 6 is enlarged to form a shoulder 6b against which the rear end of the housing 1 bears with a working clearance. To the rear of the shoulder 6b the rear end portion of the spigot 6 is shaped to form an arch 7 having depending side arms 7a. The arch 7 and its side arms 7a define a recess 7b (Figures 3 and 4) which is open at the bottom of the spigot 6 and also at the rear end thereof, the cross-sectional size of the recess being greater than that of the bore 6a of the spigot 6. Near their lower ends the side arms 7a of the arch 7 are formed with horizontally aligned holes 7c.

The housing 1 and spigot 6 accommodate a rotatable spindle 8 (Figure 3) of cylindrical form. Near its rear end, the spindle 8 is formed with a slightly enlarged cylindrical portion 8a engaging, with a running fit, in the rear end portion of the bore 6a of the spigot 6. Near its forward end, the spindle 8 is formed with a slightly enlarged cylindrical portion 8b engaging, with a running fit, in the portion 1b of the bore of the housing 1. Forwardly of the portion 8b, the spindle 8 is formed with a further enlarged cylindrical portion 8c freely accommodated in the rear end part of the bore 3b of the cutter-head 3, the portion 8c bearing, with a working clearance, against the forward end of the screw-threaded portion 1c of the housing 1.

An axially disposed cylindrical recess 8d (Figure 3) is formed in the forward end of the portion 8c of the spindle 8, and in this recess there fits the shank 9a of a cylindrical cutting tool 9 which is approximately of the same diameter as the portion 8c of the spindle so that it is also freely accommodated in the bore 3b of the cutter-head 3. The cutting tool 9 is detachably secured to the spindle 8 for rotation therewith by means of set screws 10 (Figure 3) which are engaged in the portion 8c of the spindle end and bear on the shank 9a of the tool.

The cylindrical surface of the cutting tool 9 is formed with a plurality of sharp-edged and helically arranged cutting teeth 9b, the teeth commencing at one end of the said surface and ending at the other end thereof. The part of the cutting tool 9 carrying the teeth is made of such length that its rearward end lies to the rear of the slot 5 in the cutter-head 3, while its forward end projects to a small extent from the forward end of the cutter-head. The said part of the tool 9, while being freely accommodated in the bore 3b of the cutter-head 3, is nevertheless of sufficiently large diameter to ensure that part of the toothed surface of the tool projects laterally beyond the faces 4 of the cutter-head and thus through the part of the slot 5 which opens into the bore 3b. This arrangement can clearly be seen by reference to Figures 2, 5 and 6. In the embodiment illustrated, the tool 9 has twelve teeth equally distributed around its cylindrical surface. The tool may, however, be formed with a larger or lesser number of teeth according to requirements.

The rear end of the spindle 8 is formed with a reduced screw-threaded portion 8e (Figures 3 and 4) which projects into the recess 7b in the rear end of the spigot 6 and on which is tightly screwed a toothed bevel wheel 11, the wheel thus being accommodated in the recess 7b. The wheel 11 bears, with a working clearance, against the vertical inner face of the recess 7b and thus acts, in conjunction with the enlarged portion 8c of the spindle 8, to locate the spindle longitudinally within the housing 1 and spigot 6.

Lubricant can be supplied to the running surfaces between the portion 8a of the spindle 8 and the bore 6a of the spigot 6, and between the portion 8b of the spindle and the portion 1b of the bore of the housing 1, through an oil hole 12 (Figure 3) formed through the housing and so positioned that it opens into the enlarged portion 1a of the bore of the housing, the oil hole being normally closed by a screw 13 (Figures 1, 2 and 3). A part of the lubricant supplied to the portion 1a of the bore of the housing 1 can find its way to the bearing surfaces between the spigot 6 and

the housing 1 through a radially disposed passageway 14 (Figure 3) extending between the bore 6a of the spigot 6 and an annular groove 15 formed in the outer surface of the spigot. If desired, a felt washer 16 may be arranged around the spindle 8, the washer lying against the rear end of the enlarged portion 8b of the spindle and preventing surplus lubricant from escaping from the interior of the housing 1 and finding its way on to the cutting tool 9.

In conjunction with the spigot 6 there is provided a second spigot 17 which is shown in the drawings to extend vertically downwards from the spigot 6 and is formed with a cylindrical bore 17a (Figure 3). The upper end portion of the spigot 17 is enlarged and shaped to form a reclining arch 18 having side arms 18a extending forwardly in the direction of the spigot 6, these arms being spaced apart to a greater extent than are the side arms 7a of the arch 7 of the spigot 6. The arch 18 and its side arms 18a define a recess 18b (Figures 2 and 3) which opens at the top of the spigot and is also open at the side adjacent the spigot 6, the cross-sectional size of the recess being greater than that of the bore 17a of the spigot 17. The forward end portions of the side arms 18a of the arch 18 overlap the lower end portions of the side arms 7a of the arch 7 of the spigot 6, and are formed with holes 18c (Figure 4) which are not only in horizontal alignment with each other but are also in an alignment with the holes 7c in the side arms 7a of the arch 7 of the spigot 6. The holes 18c are made of a little larger diameter than the holes 7c.

The two spigots 6 and 17 are pivotally connected together by means of shouldered pivot pins 19 which are engaged in the registering holes 7c and 18c and the outer ends of which are formed with flats as shown in Figures 1 and 7. The shoulders on the pivot pins 19 prevent the pins from moving inwardly when they are fully engaged in the holes 18c and 7c, and the pivot pins are held against outward movement by means of a yoke 20 which straddles the arch 7 of the spigot 6 and the depending arms of which are formed with holes engaging closely with the flats on the outer ends of the pivot pins. The yoke 20 itself is held in position by means of a screw 21 which passes through a hole in the top of the yoke and engages in a screw-threaded hole in the top of the arch 7.

By pivotally connecting the spigot 17 to the spigot 6 by means of the pivot pins 19, the two spigots can be swung relatively to one another to vary the angle between them, the movement taking place about the axis of the pivot pins.

The spigot 17 accommodates a rotatable cylindrical spindle 22 (Figure 3) which is formed near its upper and lower ends with slightly enlarged cylindrical portions 22a engaging, with a running fit, in the bore 17a of the spigot. The lower end of the spindle 22 projects below the lower end of the spigot 17 and is formed with a collar 22b which bears, with a working clearance, against the lower end of the spigot. Below the collar 22b the spindle is fitted with a transversely disposed driving pin 22c.

The upper end of the spindle 22 is formed with a reduced screw-threaded portion 22d (Figures 2 and 3) which projects into the recess 18b in the upper end of the spigot 17 and on which a toothed bevel wheel 23 is tightly screwed, this wheel being in mesh with the wheel 11 on the spindle 8. The wheel 23 bears, with a working clearance, against the bottom of the recess 18b and thus acts, in conjunction with the collar 22b, to locate the spindle 22 vertically with respect to the spigot 17.

The teeth of the two bevel wheels 11 and 23 are so shaped, and the pivotal connection between the two spigots 6 and 17 is so located relatively to the pitch circles of the teeth on both wheels, that the teeth always remain in mesh irrespective of the angle at which the spigot 17 lies relatively to the spigot 6.

Lubricant can be supplied to the running surfaces between the portions 22a of the spindle 22 and the bore 17a of the spigot 17, through an oil hole 24 (Figures 3 and 4) formed through the spigot and opening into that part of the bore thereof which lies between the portions 22a of the spindle.

The outer surface of the lower end portion of the spigot 17 is formed with a tapered screw-thread 17c with which is engaged the upper end of a sleeve 25 freely surrounding and projecting below the lower end portion of the spindle 22. The sleeve 25 is designed to enclose the power output end of a flexible drive shaft (not shown) extending from a suitable source of power and adapted to be coupled to the spindle 22 through the medium of the driving pin 22c on the lower end thereof. The external surface of the sleeve 25 may be milled as shown in Figures 1 and 4 to enable a good grip to be obtained thereon when desired.

When the spindle 22 has been coupled to the flexible drive shaft in the manner previously mentioned, the instrument is used as follows:

The hand-piece 2 is held in the hand and the power to the flexible drive shaft is then switched on. The drive shaft thus acts to drive the spindle 22 with consequent rotation of the bevel wheel 23 thereon. This wheel acts to rotate the bevel wheel 11 with consequent rotation of the spindle 8 and cutting tool 9. The flat faces 4 of the cutter-head 3 are now presented to the hoof to be trimmed. As part of the cutting tool 9 projects from this face, the cutting teeth 9b of the tool will act to trim away the part of the hoof to be removed.

The cutting tool can be applied with just the right amount of pressure to the hoof so that the trimming operation will be performed smoothly and neatly and yet with speed. When the exposed part of the cutting tool 9 has penetrated to a certain extent into the hoof, the faces 4 of the cutter-head 3 will come up against the hoof and thus act as a stop preventing further penetration, and thereby avoiding risk of injury to the sensitive part of the animal's foot. Moreover, as the projecting part of the cutting tool lies between the hoof and the upper and lower parts of the cutter-head 3 when the instrument is in use, the hoof and head act as a shield for this part, thus avoiding risk of injury to the operator from the cutting tool.

As the housing 1 is mounted for rotation on the spigot 6, the hand piece 2 can be rotated while the instrument is in use so that the faces 4 are presented to the hoof at an angle best suited to the trimming operation to be performed.

In the modification illustrated in Figure 6, the cylindrical surface of the cutting tool 9 is not only provided with the teeth 9*b*, but teeth 9*c* are also formed on the exposed outer end of the cutting tool. This gives the cutting tool a greater range of usefulness as the teeth 9*c* at the end of the tool can be used for carrying out a trimming operation in cases where the teeth 9*b* on the cylindrical surface of the tool are not best suited for the purpose.

Should, in course of time, the teeth on the cutting tool 9 become excessively worn, the tool can be removed for reconditioning or replacement, by first unscrewing the cutter-head 3 from the housing 1 and then loosening the set screws 10.

In practice, and as shown in Figure 7, the instrument will be fitted with a guard, generally indicated at 26, preventing the fingers or clothing of the user from getting caught in the meshing teeth of the bevel wheels 11 and 23 when the instrument is in operation. The guard comprises a hood 27 of leather or other suitable flexible material, which covers the rear end of the spigot 6 and the upper end of the spigot 17. The hood 27 is held in position by being joined to a metal ferrule 28 which is engaged around the housing 1 and lies against the shoulder 6*b* on the spigot 6. The top part of the hood 27 is held down by the screw 21 used for holding the yoke 7 in position, this screw also acting in part to prevent the ferrule 28 from moving along the housing 1. The ferrule is further held against movement by a tongue 29 of leather (Figure 4, Figure 7) or other suitable flexible material, one end of which is secured to the ferrule while the other end surrounds the spigot 17, this latter end supported by a pin 30 (see also Figures 1, 3 and 4) projecting from the spigot 17.

WHAT WE CLAIM IS:

1. An instrument for trimming the hooves and dressing the teeth of animals, for example sheep or horses, including a spindle journalled for rotation in bearings, an elongated cylindrical cutting tool carried by and connected to the spindle, stop means extending over a substantial portion of the length of the tool, for limiting the penetration of the tool in the radial direction thereof, and means enabling the spindle to be connected to a source of motive power for rotating the spindle and thereby rotating the cutting tool.

2. An instrument for trimming the hooves and dressing the teeth of animals, for example sheep or horses, including a spindle journalled for rotation in a housing, a tubular cutter-head provided at one end of the housing, a cylindrical cutting tool provided on the corresponding end of the spindle and extending, with a working clearance, into the cutter-head, and means enabling the other end of the spindle to be placed in connection with a source of motive power for rotating the spindle with consequent rotation of the cutting tool, the cutter-head being so formed that part of the cylindrical surface of the cutting tool projects from the head.

3. An instrument as claimed in Claim 2, wherein cutting teeth are formed on the cylindrical surface of the cutting tool.

4. An instrument as claimed in Claim 3, wherein cutting edges extend helically along the cylindrical surface of the cutting tool.

5. An instrument as claimed in Claim 3 or 4, wherein the end of the cutting tool remote from the spindle projects from the corresponding end of the cutter-head, this end of the tool also being formed with cutting teeth.

6. An instrument as claimed in any one of Claims 2 to 5, wherein the cutter-head is formed with a slot which opens into the bore of the head and through which part of the cylindrical surface of the cutting tool projects so that the said part is exposed at the outside of the head.

7. An instrument as claimed in Claim 6, wherein the slot is produced by forming the outer surface of the cutter-head with faces extending in the direction of the length of the head from the free end thereof, the plane of said faces being so positioned as to intersect the bore of the cutter-head.

8. An instrument as claimed in any one of Claims 2 to 7, wherein the housing and cutter-head together constitute a hand-piece.

9. An instrument as claimed in any one of Claims 2 to 8, wherein the housing is mounted on a spigot having a bore through which the spindle passes and which forms a bearing for the spindle.

10. An instrument as claimed in Claims 8 and 9 and wherein the hand-piece is rotatable relatively to the spigot.

11. An instrument as claimed in Claim 9 or Claim 10, wherein a bevel wheel is secured to

the end of the spindle opposite that provided with the cutting tool, this bevel wheel being in mesh with a second bevel wheel secured to a second spindle which is journalled for rotation in a second spigot pivotally connected to the first-mentioned spigot so that the angular relationship between the two spigots can be varied.

12. An instrument as claimed in Claim 11, wherein the pivotal connection between the two spigots is so located and the teeth of the two bevel wheels are so shaped that the teeth of the wheels remain in mesh irrespective of the angular position of the two spigots relatively to one another.

13. An instrument as claimed in Claim 11 or Claim 12, wherein the second spindle is adapted for connection to a source of motive power.

14. An instrument for trimming the hooves and dressing the teeth of animals for example sheep or horses, the instrument having its parts constructed, arranged and adapted to operate substantially as hereinbefore described with reference to Figures 1 to 5 of the accompanying drawings.

15. An instrument as claimed in Claim 14 when modified substantially as hereinbefore described with reference to Figure 6 of the accompanying drawings.

16. An instrument as claimed in Claim 14 or Claim 15 and including a guard when constructed and arranged substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

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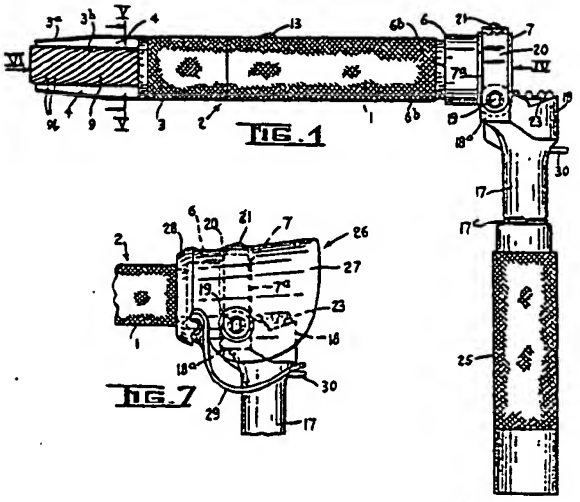

FIG.1

FIG.7

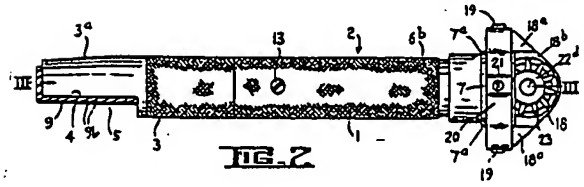

FIG.2

838,501 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale.*

SHEETS 1 & 2

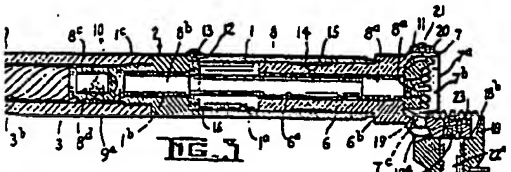

FIG. 1

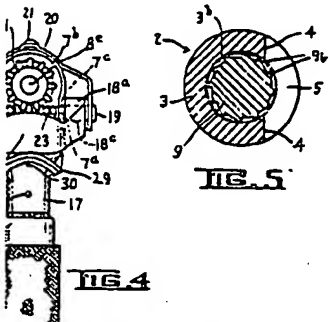

FIG. 4

FIG. 5

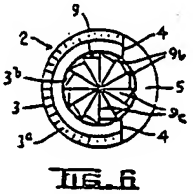

FIG. 6

838,501 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

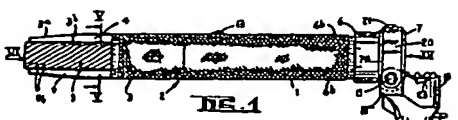
FIG. 1

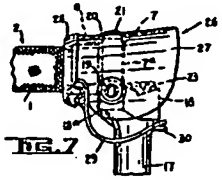
FIG. 7


FIG. 2

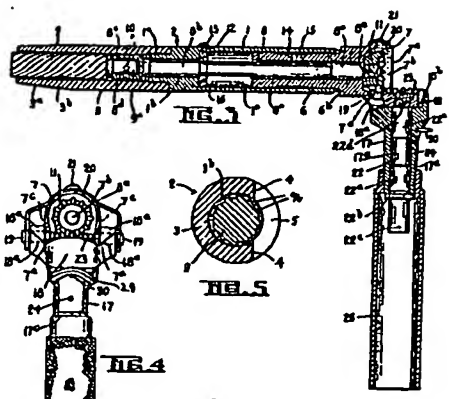
FIG. 3

FIG. 4

FIG. 5


FIG. 6

PN - JP9075379 A 19970325

PD - 1997-03-25

PR - JP19950234990 19950913

OPD - 1995-09-13

TI - SPINDLE DEVICE FOR CUTTING TOOTH OF BIG ANIMAL

IN - KOJIMA TOSHIO; OHIGATA HIROSHI

PA - OSADA RES INST LTD

EC - A61D5/00

IC - A61D5/00

TI - Spindle equipment for cutting teeth of horse and other large animals - has electrical insulation provided covering chuck side end in rotation shaft of spindle mounted to chuck of electric drill

PR - JP19950234990 19950913

PN - JP9075379 A 19970325 DW199722 A61D5/00 004pp

PA - (NAGA-N) NAGATA CHUO KENKYUSHO KK

IC - A61D5/00

AB - J09075379 The equipment (20) consists of an outer cylinder (22) assembled with a rotation shaft (21) inside the bore. One end of the rotation shaft is fixed to the chuck (11) of an electric drill (10). A tooth cutting tool (40) is fixed to the other end of the rotation shaft to cut the animal's tooth. The chuck side end of the rotation shaft is covered with an electrical insulation (25). A protective case (26) is movably provided in the axial direction to cover the chuck side end of the outer cylinder and the chuck when mounting the rotation shaft to the chuck.

- The exposed part at the chuck side end of the rotation shaft is covered by the protective case when cutting the animal's tooth. The shaft (41) of the tooth cutting tool is inserted in the axial hole of the drill installation part (28) fixed to the free end of the rotation shaft.
- ADVANTAGE - Prevents leakage electric current of electric drill from being transmitted to rotation shaft. Prevents animal's tongue or hair from being rolled at chuck side end of rotation shaft. Miniaturizes structure of tooth cutting tool installation part. Facilitates easy viewing of tooth cutting work part.
- (Dwg. 1/3)

OPD - 1995-09-13

AN - 1997-239544 [22]

PN - JP9075379 A 19970325

PD - 1997-03-25

AP - JP19950234990 19950913

IN - KOJIMA TOSHIO;OHIGATA HIROSHI

PA - OSADA RES INST LTD

TI - SPINDLE DEVICE FOR CUTTING TOOTH OF BIG ANIMAL

AB - PROBLEM TO BE SOLVED: To provide a spindle device with which the probability of electric leak is eliminated in the case of cutting uniformly the tooth surface of big animal such as a horse, there is no trouble to roll in a tongue or hair, and further, a working part can be easily watched.

- SOLUTION: This spindle device 20 is composed of an outer cylinder 22 and a rotary shaft 21, and the tooth of animal is cut by a tooth cutter 40 by revolving the rotary shaft 21 by an electric drill while fixing one end of the rotary shaft at a chuck part 11 of an electric drill 10 and fixing the tooth cutter 40 at the other terminal part. Electric insulation 25 is applied to one end of the rotary shaft so that the electric leak from the electric drill 10 can not be transmitted to the rotary shaft 21. At one end of the

er cylinder 22, a protection case 26 for covering a part of the rotary shaft 21 is provided so as to be freely moved axially, and the exposed part of the rotary shaft 21 is covered with the protection case 26. A shaft 41 of the tooth cutter 40 is inserted and fixed into a shaft hole at a top end 28 of the rotary shaft 21.